CONFERENCE ON DISARMAMENT

CD/980
27 March 1990

Original: ENGLISH

CZECHOSLOVAKIA

List of experts and laboratories

for examination and analyses in the event of an investigation of reports of possible use of chemical, bacteriological (biological) or toxin weapons

1. Czechoslovakia has been consistently adhering to the principles and purposes of the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases and of Bacteriological Methods of Warfare which it signed as early as 1925. Czechoslovakia has always condemned any actions violating the Protocol and has advocated elaboration of verification measures which would guarantee strict compliance with its provisions.

2. In this context, Czechoslovakia has welcomed the conclusion last year of the work of the expert group of the United Nations Secretary-General that prepared, in conformity with resolution 42/37C, technical guidelines and procedures for the timely and efficient investigation of reports of possible use of chemical, bacteriological (biological) or toxin weapons.

3. In reply to the request made in General Assembly resolution 44/115 B, and in keeping with the elaborated standards (appendix II and VI of document A/44/561), Czechoslovakia informed the Secretary-General of the United Nations that it is ready to provide two consultants, 15 qualified experts and five laboratories for examination and analyses in the event of an investigation of reports of possible use of chemical, bacteriological (biological) or toxin weapons.

4. The selected experts possess extensive knowledge in the fields of analytical and organic chemistry, biochemistry, biology, virology and toxicology. They are prepared to take samples on the spot and to analyze them. If requested, they can travel immediately to a place subjected to investigation. The laboratories are equipped so as to be capable to analyse various chemical and toxic substances and staffed with experienced specialists.

GE.90-60422/1720B

5. Czechoslovakia believes that the attached list of experts and laboratories may be of interest to the Conference on Disarmament since it is ready to involve both these experts and the laboratories in implementing the future Convention and in particular in the work of the respective organs of the future Organization for the Prohibition of Chemical Weapons. Moreover, presentation of these data by a number of countries may result in more contacts between scientists in favour of extensive exchange of views, scientific publications or scientists themselves. Consequently, more effective measures against not only chemical weapons but also against highly toxic substances in general, including protection of environment, could be discussed.

6. In the following list, the information on experts is limited to their personal and professional data, without mention of their language proficiency, citizenship, availability and material or equipment which could be brought by them. The same approach to laboratories was applied: the data on specification of any particular requirements for preparation of samples, on specification of any particular requirements with respect to customs and fees and responsibilities are omitted.

7. List of experts and laboratories

The following data are given for experts:

1. Name of expert
2. Current position
3. Mailing address (office and home)
4. Telephone numbers, telex, telecopy or telefax
5. Educational background

The following data are given for laboratories:

1. Name of laboratory
2. Mailing address
3. Telephone numbers
4. General nature of the laboratory
5. Equipment and experiences

7.1. Experts consultants:

1. Jiří BAJGAR, Assoc. Prof., MD, PhD, colonel
2. Deputy Head of Department of Toxicology, Military Medical Academy, Hradec Králové

3. Office: Dept. Toxicol., Military Medical Academy
502 60 Hradec Kralove
Czechoslovakia

Home: Dukelská 789
500 02 Hradec Králové, Czechoslovakia

4. Office: 682381, 682378; Home: 611450

5. Medical Faculty, Charles University at Hradec Králové

204 scientific papers dealing with the treatment of intoxication, detection of Chemical Warfare Agents, biochemical characterization of their action. More than 20 papers dealing with chemical disarmament; expert (chemical weapons) of Czechoslovak delegation to the Conference on Disarmament (since 1985).

1. Miroslav SPLINO, Assoc. Prof., MD, PhD, colonel

2. Head of Department of Epidemiology, Military Medical Academy, Hradec Králové

3. Office: Department of Epidemiology, Military Medical Academy,
502 60 Hradec Králové, Czechoslovakia

Home: Formánkova 433
500 11 Hradec Králové, Czechoslovakia

Office: 6845792 or 682407

5. Medical Faculty, Charles University at Hradec Králové

120 scientific papers, dealing with the experimental pathogenesis and clinic of cryptococcosis, nocardiosis, yersiniosis and the microbial monitoring in immunocompromised patients.

7.2 Qualified experts

1. Viliam FOLDESI, Dipl. Eng., major

2. Technical Director of the Military Facility

3. Office: Ministry of National Defence,
PS 61/26
160 00 Praha, Czechoslovakia

Home: Majakovského 58/2
972 43 Prievidza, Czechoslovakia

4. Office: 330 42636; Home: 32520

5. Military Academy of the Land Forces (military engineering and military chemistry) Vyskov

On the basis of his theoretical educational background and practical experience, he is familiar with the methods of synthesis of Chemical Warfare Agents and other toxic substances, with their analysis including development of new methods, and with the detection of Chemical Warfare Agents in field conditions.

1. Vratislav CERNY, Dipl. Eng.

2. Analytical Laboratory Director

3. Office: Research Institute for Organic Syntheses
532 18 Pardubice - Rybitví
Czechoslovakia

4. Office: 42103 telex: 196222 vchz

5. Institute of technology level

Theoretical and practical experiences in the field of analytical and physical chemistry

1. Josef KOUBEK, Dipl. Eng., PhD

2. Assistant Professor, Institute of Chemical Technology, Prague

3. Office: Prague Institute of Chemical Technology
Suchbátarova 5
166 28 Praha, Czechoslovakia

Home: Skábova 3057
106 00 Praha 10, Czechoslovakia

4. Office: 332 4216 telex: 122 744 VSCH/C Telefax: 42-2-3114769

5. Technical University

Setting-up of industrial chemical plants, analytical control of chemicals.

1. Tibor GOGH, RNDr. (Doctor of Natural Sciences), PhD

2. Research worker, Head of research group of reaction intermediates

3. Office: Research Institute of Chemical Technology
Dimitrovova 34
836 03 Bratislava, Czechoslovakia

Home: Zikova 6
851 00 Bratislava, Czechoslovakia

4. Office: 2007/2990 telex: 925 76

5. Comenius University Bratislava,
Faculty of Natural Sciences,
Department of Organic Chemistry
Relevant experience - basic chemical research, investigations of chemical structure of organic substances.

1. Aleš HORNA, Dipl, Eng., PhD

2. Head of Department of analytical chemistry

3. Office: VCHZ Synthesia
532 17 Pardubice - Semtín
Czechoslovakia

Home: Srch 141
533 52 Staré Hradiště, Czechoslovakia

4. Office: 4925816

5. Technical University - organic chemistry, analytical chemistry
Spot organic analysis, analysis of explosives, methods development.

1. Josef FUSEK, Assoc. Prof., MD, PhD, colonel

2. Head of the Military Medical Academy, Hradec Králové

3. Office: Military Medical Academy
502 60 Hradec Králové
Czechoslovakia

Home: K Biřičce 1650
500 08 Hradec Králové, Czechoslovakia

4. Office: 6845760, 6845518; Home: 23333

5. Medical Faculty, Charles University at Hradec Králové

142 scientific papers dealing with the effect of highly toxic substances, the treatment of intoxications, pharmacological characterization of the Chemical Warfare Agents.

1. Ivan POHL, Assoc. Prof., MD, PhD, lieutenant colonel

2. Head of the Department of Education and Science, Military Medical Academy, Hradec Králové

3. Office: Department of Education and Science,
Military Medical Academy
502 60 Hradec Králové
Czechoslovakia

Home: Marxova 1415
500 06 Hradec Králové, Czechoslovakia

4. Office: 6845753, 6845600; Home: 3005

5. Charles University, Medical Faculty, Hradec Králové

50 scientific papers in Czechoslovak Journals, expert of Czechoslovak delegation to the Conference on Disarmament (1987, 1988). Qualified especially in the field of epidemiology.

1. L. ROSIVAL, MD, DSc.

2. Deputy Director, Director of the Centre of the Hygiene

3. Office: Research Institute of Preventive Medicine
Limbova 14
833 01 Bratislava, Czechoslovakia

Home: Ľ. Zúbka 7
841 01 Bratislava, Czechoslovakia

4. Office: 371 094; Home: 365 579

5. Faculty of Medicine

Experience in the field of toxicology and hygiene.

1. Otaka KRS, MD, major

2. Senior Lecturer, Department of Toxicology, Military Medical Academy, Hradec Králové

3. Office: Dept. Toxicology, Military Medical Academy
502 60 Hradec Králové
Czechoslovakia

Home: Vrchlického 573
500 02 Hradec Králové, Czechoslovakia

4. Office: 682381, 682378 Home: 611450

5. Medical Faculty, Charles University at Hradec Králové

Postgraduate training in general medicine. Specialized course for military health and epidemiology professionals. Teaching experience in military toxicology and normal anatomy, some experiences in scientific research work, histopathology and histochemistry following intoxications with Chemical Warfare Agents.

1. Ivana TUŠAROVÁ, Dipl. Eng.

2. Research worker

3. Office: Research Institute of Food Industry
Radiová 7
102 31 Praha 10, Czechoslovakia

Home: Zelená 21
160 00 Praha 6, Czechoslovakia

4. Office: 540841-9/15

5. Institute of Chemical Technology, Prague

10 years practice, 20 publications in the field of analysis of Chemical Warfare Agents.

1. Ivan ČIŽNÁR, DSc

2. Senior scientist, Head, Department of Bacteriology

3. Office: Research Institute of Preventive Medicine
Limbova 14
833 01 Bratislava, Czechoslovakia

Home: Púpavova 21
841 01 Bratislava, Czechoslovakia

4. Office: 372 820, 272, 560 ext. 493 telex: 92279
Home: 326 016

5. Doctor of Sciences in Molecular Biology, Bratislava,

Experience in bacterial toxicology, expert, in vitro and in vivo assessment of action of bacterial toxins.

1. Bohumil TICHÁČEK, MD

2. Director (IHE)

3. Office: Institute of Hygiene and Epidemiology
Šrobárova 48
100 42 Praha 10, Czechoslovakia

Home: Drahobejlova 5
190 00 Praha 9, Czechoslovakia

4. Office: 742812; Home: 838492

5. Charles University, Medical Faculty, Prague

Epidemiology, Antibacteriological protection.

1. Jaromír TRUNKÁT, MVDr. (Doctor of Veterinary Medicine)

2. Vice-Director of Central State Veterinary Institute, Prague

3. Office: Central State Veterinary Institute
Sídlištní 156
165 03 Praha 6 - Lysolaje, Czechoslovakia

Home: Sídlištní 212
165 03 Praha 6 - Lysolaje, Czechoslovakia

4. Office: 341 551, 341 054 telex: 123594
Home: 3239268

5. Faculty of Veterinary Medicine, Brno

31 publications, experiences in different State Veterinary Institutes, expert in Cuba (tbc, BaB and other contagious diseases); investigations in practical use of mobile vertinary laboratories; experience in the control of contagious diseases of farm animals; participation in the courses organized by FAO.

1. Otto PAWEL, MVDr (Doctor of Veterinary Medicine), PhD

2. Veterinarian with higher specialization

3. Office: Central State Veterinary Institute
Sídlištní 156
165 03 Praha 6, Czechoslovakia

Home: Na Petřinách 59
162 00 Praha 6, Czechoslovakia

4. Office: 341551 telex: 123594
Home: 3536456

5. Faculty of Veterinary Medicine, Brno

141 publications particularly in the area of field investigations; research worker in the field of effects of nuclear, biological and chemical weapons on animals and food of animal origin; teaching and training personnel of mobile veterinary laboratories.

1. Miroslav KOUKAL, RNDr (Doctor of Natural Sciences) Phd

2. Senior virologist in the Laboratory of Gnotobiology of the Institute of Microbiology, Czechoslovak Academy of Sciences

3. Office: Lab. Gnotobiology, Institute of Microbiology, C.A.S.
549 22 Nový Hrádek, Czechoslovakia

Home: Havlíčkova 1112
547 00 Náchod, Czechoslovakia

4. Office: 95722; Home: 20852

5. Faculty of Natural Science of the Charles University, Prague.

Scientific work at different Institutes: College of Agriculture in Prague, Royal Veterinary College in London, Institute of Sera and Vaccines, Department of Virology, Laboratory Gnotobiology, Department of Virology Control of the Czechoslovak Academy of Sciences.

7.3. Laboratories

1. Department of Toxicology, Military Medical Academy

2. Military Medical Academy, Department of Toxicology
502 60 Hradec Králové, Czechoslovakia

3. 682381, 682377, 682378, 682387

4. The Laboratory is designed to study the toxic effect of highly toxic substances including CWA, to clarify their action on biochemical, behavioural, histochemical, pharmacological and electrophysiological level, to study and develop antidotes against intoxications with these compounds, to analyse all types of samples with respect to the presence of known CWA, to test decontamination effectiveness of known and developed decontamination agents for humans.

5. Analytical equipment; possibilities for synthesis of different compounds in laboratory quantitites; biochemical, behavioural techniques, eletrophysiological methods; pharmacological testing, histological and histochemical evaluation. The experiences are documented in the Internal Reports dealing with the effects of CWA, on decontamination efficacy and reports improving CWA detection and diagnosis of intoxications. Bibliography is available on request.

1. Department of Analytical-Physical Chemistry

2. Research Institute for Organic Syntheses,
532 18 Pardubice-Rybitví, Czechoslovakia

3. 42103

4. Organic analytical laboratory

5. Mass spectrometry; NMR; GC with ECD, FID; ICP spectrometry; AAS; Particle size; Electrochemistry - polarography, titrimetry; Thermical analysis; UV-VIS-spectrometry; 11 years experiences, authorized laboratory in Czechoslovakia.

1. Prague Institute of Chemical Technology, Department of Analytical Chemistry.

2. Prague Institute of Chemical Technology, Department of Analytical Chemistry, Suchbátarova 5, 166 28 Praha, Czechoslovakia

3. 332 4044

4. Well-equipped analytical laboratory

5. GC, GLC, NMR, MS, IR, experiences in chemical analysis of organic and inorganic samples.

1. Laboratory of Organic Chemistry

Research Institute of Chemical Technology
Dimitrovova 34
836 03 Bratislava, Czechoslovakia

3. 213028, 2007/2450, 2007/2990

4. organic synthesis

5. common equipment, Gas chromotograph GCMS, IR spectrometer, HPLC DAT Detector.

1. Military Academy of the Land Forces, Department of Military Chemistry, Vyskov

2. Military Academy of the Land Forces,
Vyskov, Czechoslovakia

3. 423 2632

4. The Department of Military Chemistry is devoted to the research in the field of indication and decontamination of chemical agents in general; it is considered as educational base for preparation of specialists in this field.

5. Specific facilities and equipment

Analytical equipment; possibilities to test decontamination efficacy and the means of indications. Teaching experiences in the field of chemical specialists. The experiences are documented in the Internal Reports dealing with research of decontaminants and indications.

8. The attached list will be regularly updated and supplemented in accordance with Czechoslovakia's possibilities and with the needs of the Secretary-General of the United Nations as they may develop in future.

CONFERENCE ON DISARMAMENT

CD/981
30 March 1990

Original: English

PROGRESS REPORT TO THE CONFERENCE ON DISARMAMENT ON THE TWENTY-NINTH SESSION OF THE AD HOC GROUP OF SCIENTIFIC EXPERTS TO CONSIDER INTERNATIONAL CO-OPERATIVE MEASURES TO DETECT AND IDENTIFY SEISMIC EVENTS

1. The Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events, initially established in pursuance of the decision taken by the Conference of the Committee on Disarmament on 22 July 1976, held its twenty-ninth formal session from 19-29 March 1990, in the Palais des Nations, Geneva, under the Chairmanship of Dr. Ola Dahlman of Sweden. This was the twenty-first session of the Group convened under its new mandate by the decision of the Committee on Disarmament at its 48th meeting on 7 August 1979.

2. The Ad Hoc Group continues to be open to all member States of the Conference on Disarmament, as well as upon request to non-member States. Accordingly, scientific experts and representatives of the following member States of the Conference on Disarmament participated in the session: Australia, Canada, China, Czechoslovakia, Egypt, German Democratic Republic, Germany, Federal Republic of, Hungary, India, Iran (Islamic Republic of), Italy, Japan, Netherlands, Pakistan, Poland, Romania, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and the United States of America.

3. At their request and on the basis of previous invitations by the Conference on Disarmament, scientific experts and representatives from the following non-member States of the Conference on Disarmament participated in the session: Austria, Denmark, Finland, New Zealand, Norway, Spain and Switzerland.

4. Two representatives of the World Meteorological Organization also attended the session.

5. Under the current mandate of the Ad Hoc Group, information on national investigations related to the work of the Group has been presented by experts from Australia, Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Egypt, Finland, German Democratic Republic, Germany, Federal Republic of, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Netherlands, New Zealand, Norway, Peru, Poland, Romania, Spain, Sweden, Switzerland, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and United States of America.

6. The Ad Hoc Group reviewed the initial results of experimental activities during Phase 2 of its Second Technical Test (GSETT-2). The Group noted that 21 countries participated in the first stage of the gradual build-up to the

envisaged full-scale operation of the system to be tested. For the 16 January -6 March trial test, National Data Centers (NDCs) were established in each of the 21 participating countries, 4 experimental International Data Centers (EIDCs) were established and operated, and modern international communications links were put into place. The Group considered the overall results of these preliminary tests to be useful for planning the full-scale experiment, although not all of the essential functions were tested. The total volume of data collected, exchanged and analyzed in just one day of this warm-up phase was much greater than the sum of data in all previous experiments undertaken by the Group.

7. Those countries which participated were generally successful in extracting seismic data and transmitting these data to experimental International Data Centres (EIDCs). The Group noted with satisfaction that a number of additional countries expressed their intention to take part in future GSETT-2 activities, and are making preparations in this regard. Still, the Group considers even broader participation to be essential, in order to meet the objectives of GSETT-2.

The Group confirmed that the main focus of attention in GSETT-2 will be on the exchange of seismic waveform segments (Level II data) and the analysis of those data at EIDCs. Nevertheless, the Group agreed that seismic parameter data (Level I data) are also important, and that countries which at present are able to provide seismic parameter data only should also be encouraged to participate.

8. Also at experimental IDCs, valuable experience was gained. The Ad Hoc Group noted that the workload was heavier than expected, and that further procedures must be developed and evaluated in order to fully realize the potential of using Level I and, in particular, Level II data. However, it is essential to establish the planned direct inter-computer satellite links between the EIDCs in Moscow and Washington, D.C.

9. With regard to the use of WMO/GTS for seismic data exchange during GSETT-2, the Group and the WMO representatives agreed that further preparatory work is needed before the WMO/GTS communications channels can accommodate the voluminous Level II data. The Group welcomed a suggestion by the WMO to be represented at the forthcoming meeting (21-28 May 1990) of the WMO Commission for Basic Systems' Working Group on the GTS to discuss this issue and to provide the WMO with the needs of the Ad Hoc Group for GSETT-2. The Ad Hoc Group suggests that, on the understanding that there are no financial implications for the Conference on Disarmament, Mr. Peter Basham of Canada be requested to represent the Group at that meeting, and that Mr. Shigeji Suyehiro of Japan be requested to assist him on this matter.

10. In the light of the experience accumulated so far, the Group revised its preliminary plans and instructions for GSETT-2, and agreed to proceed in accordance with the schedule annexed to this progress report.

11. During the time period until the Group's next session, Phase 2 of GSETT-2 will continue with a number of activities, gradually building up to the envisaged full-scale operation of the system to be tested:

- New NDCs will be established by countries planning to join the GSETT-2, and communication links between these NDCs and EIDCs will also be established.

- New procedures will be worked out and tested regarding processing of Level I and II data at EIDCs.

- Tests involving exchange of data from all participating stations and the processing of these data at all four EIDCs will be conducted for four additional days (19, 20, 26, 27 June 1990).

12. The Group also discussed the schedule for the full-scale test (Phase 3) of GSETT-2. In the light of experiences gained so far, and in order to enable additional countries to make the necessary preparations, the Group decided to revise the preliminary schedule. The Group now plans to carry out the full-scale test (Phase 3) in two parts. The first part will comprise preparatory testing during the second half of 1990. The main phase of GSETT-2, involving continuous full-scale operation over an extended period of time, will be conducted during the first half of 1991.

13. The Ad Hoc Group suggests that its next session, subject to approval by the Conference on Disarmament, should be convened from 30 July-10 August 1990.

Annex

Schedule of Remaining GSETT-2 Activities

April 1990 until end of the main phase (Phase 3)

- EIDC facilities remain open for development and testing of NDC-EIDC and inter-EIDC communications links and establishment of correct message formatting by NDCs.

- NDCs conduct practical tests to establish appropriate NDC-EIDC connections.

April, May 1990

- EIDCs work jointly to improve procedures for FEB production by reprocessing data from the March 6 data day, on a schedule to be agreed among them. EIDCs will request NDCs to transmit any missing data for that day.

21-28 May 1990

- Mr. Peter Basham, and Mr. Shigeji Suyehiro (if necessary), attend the meeting of the WMO Commission for Basic Systems' Working Group to conduct preparatory discussions on using the WMO/GTS during GSETT-2.

3-8 June 1990

- Informal meeting of the EIDC Co-ordinators and their technical staff to review results of the April/May reprocessing experiment and work out procedures to be used for further Phase 2 experiments. This meeting will be hosted by the United States EIDC Co-ordinator in Los Angeles.

19, 20, 26, 27 June 1990 (4 data days)

- Further Phase 2 data exchange and processing, according to agreed time schedules.

July 1990

- Further processing at EIDCs of data collected for the June data days, and evaluation of the results in co-operation among IDCs.

30 July-10 August 1990

- Thirtieth GSE session in Geneva to evaluate progress and plan further phases.

12-18 November 1990 (tentative)

- Preparatory test for full-scale experiment - all procedures will be tested for seven consecutive data days.

February 1991

- Thirty-first GSE session in Geneva to evaluate progress and plan the Phase 3 full-scale experiment.

1 April-26 May 1991 (tentative)

- Phase 3 full-scale experiment for 56 consecutive data days.

July/August 1991

Phase 4:

- Thirty-second GSE session in Geneva to evaluate GSETT-2 and prepare a report to the CD.

CONFERENCE ON DISARMAMENT

CD/982
30 March 1990

Original: ENGLISH

YUGOSLAVIA

REPORT ON THE NATIONAL TRIAL INSPECTION

INTRODUCTION

According to the proposal of the Ad Hoc Committee on Chemical Weapons that National Trial Inspection should be carried out by interested countries in order to verify whether it is possible to ascertain that declared chemical industry facilities are not used for prohibited purposes, a Yugoslav Trial Inspection was carried out.

Ever since the beginning of the negotiations on the prohibition of the use of chemical weapons, Yugoslavia has supported all the proposals related to the national verification measures. In this connection, document CD/482 of 26 March 1984 contains the proposal containing the scope of national verification, and the role, tasks and composition of the national team. In addition, document CD/613 of 10 June 1985 contains the proposal by which large-scale production facilities of the chemical industry should be subject to national verification measures. The aim of these inspection measures was to create confidence among the parties to the Convention, and to envisage, at this early stage of the negotiations, the conditions in which the highly complex tasks of the team of inspectors will be carried out. Today, many countries have already indicated by their measures of national trial inspection, the possible solutions and the problems resulting from such inspection. More than 20 countries have shown that the task is not an easy one, and that it requires a clear definition of the volume of the work to be done, the tasks of each member of the inspection team and the role of the facility representatives, which can be a very useful one in dealing with and defining complex operations. Finally, as it has been pointed out several times at the Conference, the purpose of such inspection is to create confidence among the parties to the Convention and to create pre-conditions for a multilateral inspection.

In view of the past experience of numerous delegations concerning the question of national trial inspection, we organized a routine inspection of a plant for the production of chemicals declared under Schedule (3) of the Annex to article VI of the draft convention.

1. OBJECTIVE

A national trial inspection was organized to test whether a facility is not used to produce any chemicals other than the declared ones, and whether the produced quantity is equal to the declared one.

2. COMPOSITION OF THE INSPECTION TEAM

- A representative of the Federal Secretariat for Foreign Affairs;
- A representative of the Federal Secretariat for National Defence;
- A representative of the Chamber of Economy of Yugoslavia, Secretariat for Chemical Industry;
- An analytical chemist from a research institute;
- A chemical engineer, doctor of chemistry from a research institute, member of the Yugoslav delegation in the CD.

3. DESCRIPTION OF FACILITY

The plant concerned is part of the PIB enterprise - Industry of Basic Chemistry, Baric, Beograd, intended for the production of toluene diisocyanate (TDI) and linear alkyl benzoates (LAB). The chemical which was the object of our inspection was phosgene, a Schedule (3) chemical. It is produced in a single-purpose reaction vessel (main reactor, fig. 1); there is also another smaller reactor for the finalization of the process (clean-up reactor, fig. 1).

The entire quantity of phosgene is utilized in the production of toluene diisocyanate (TDI). Presently, it is not envisaged for sale to other plants. (The plant is still in the stage of production preparation.) The continuous process of production was planned on the basis of the well-known Stauffer process; the raw materials are carbon monoxide and chlorine, and the catalyst is carbon. The phosgene output in this process is 92 per cent according to the project and the installed equipment. Carbon monoxide is produced in the plant (fig. 2.3), while chlorine is supplied from the HIP plant, Pancevo. For this purpose, containers for the storage of chlorine are provided for within the plant for complex (fig. 2.5). The plant does not produce other chemicals listed on the Schedule (3).

4. CONDUCT OF TRIAL INSPECTION

The visit to the plant included a meeting with the manager and engineers; the staff was informed about the purpose of the inspection. The Commission representatives familiarized themselves with the plant's production programme, and toured: the automatic control room (fig. 2.1), the phosgene production unit (fig. 2.2), the carbon monoxide production unit (fig. 2.3) and tanks for storing chlorine (fig. 2.5), the analytical laboratory (fig. 2.6) and the medical centre (fig. 2.7).

Figure 2 (Attachment 2) shows the layout of the plant's units. The members of the Commission also acquainted themselves with workers' protective and medical measures.

The plant's main product is toluene diisocyanate (TDI). The raw materials for this product are dinitrotoluene and phosgene. Dinitrotoluene is transformed into toluenediamine which reacts together with phosgene to produce TDI. Phosgene is produced according to the well-known process (Stauffer process) from carbon monoxide and chlorine, with carbon as catalyst. Carbon monoxide is produced from natural gas, while chlorine is purchased from the enterprise HIP, Pancevo. Chlorine is transported by tank-trucks.

The phosgene production unit is shown (diagram) on figure 1 (Attachment 1).

The members of the Commission were informed about the problems facing the plant at the earliest stage of production. Namely, the Commission's visit to the plant took place at a time when preparations for phosgene production were under way. Therefore, the entire facility was under the production régime, and all lines, vessels and automatic controls of the flow of raw materials and products were tested, including automatic control of technological parameters. It is envisaged that the whole process of phosgene production be carried out automatically and controlled from the room for the regulation of all parameters. The instruments for automatic process control can be sealed, whereby the process of control is verified, i.e. it is not possible to change the declared production.

All protective and medical measures applied in the course of production were discussed. To that effect, personal safety equipment for workers and inspectors was demonstrated.

Subsequently, a comparison was made with the parameters monitored in the reaction vessels, and associated pipework, storage tanks, etc. Within the plant there are steel tanks for both chlorine and phosgene. There is an empty tank for each respective chemical in case of emergency.

The Commission toured the facility and inspected all the ducts, measuring instruments, valves, reactors and distillation lines. It also acquainted itself with sample-taking procedures and the sites envisaged for taking samples.

In the analytical laboratory, the analytical methods and the sample-taking procedure were discussed. The Commission acquainted itself with the methods to be applied in sample analysis. The basic technique is gas-chromatography (GLC) for which the laboratory is equipped with sophisticated instruments. All the safety measures to be applied in the sample-taking procedure and preparation for analysis were also discussed. The inspectors were supplied with equipment for taking gas and liquid samples, and the existing plant equipment would also be used.

5. DOCUMENTATION

The inspector had an insight into the documentation concerning:

- the plant, location of facilities and tanks for storing raw materials;
- the layout diagram of the phosgene production unit of the PIB;
- the production plan;
- quantity and quality of the raw materials needed for phosgene and TDI production, and
- material balance related to the annual production of phosgene.

6. DURATION OF THE NATIONAL TRIAL INSPECTION

- A meeting of the inspection team before the on-site inspection.
- A meeting with the plant manager and engineers.
- On-site inspection (one day).
- A meeting of the inspection team after the on-site inspection.

7. CONCLUSIONS OF THE INSPECTION

The main conclusion of the inspectors on the basis of the information presented is that the facility corresponds to the standard facility for continuous production of phosgene. The capacity of the facility corresponds to the planned capacity. Within the plant grounds there are reservoirs for phosgene storage. The amount of phosgene stored in the reservoirs is used only to ensure the continuous process of TDI production.

A quantitative inspection of the process can be conducted on two bases: that of the automatic records of raw materials and products, and that of the inspection of technological parameters also automatically recorded.

Since specifically designed for the production of phosgene, the facility is not multi-purpose and it is, therefore, less doubtful whether such a facility can produce any other chemical either on list (3) or on lists (1) and (2).

8. EVALUATION OF THE INSPECTION

After the inspection several issues came up which should be underlined in order to have a quantitative evaluation of the verification results. Certain basic requirements have to be fulfilled for the inspection to be successful. It is necessary to:

(a) give a precise description of the location of the plant;

To avoid misunderstandings regarding the plant being the object of inspection within the enterprise complex, a layout of the facilities, together with the plant notification and the report of the Commission should be submitted. A summary of the processes and operations which can be carried out in the plant should be attached. Location information of the entire enterprise is also necessary.

(b) describe in detail the process of the synthesis of the chemical under inspection;

This will require the presentation of information on the material balance of the processes (input raw materials and output products), technological parameters and methods for quality control of raw materials and products. With the assistance of the plant personnel, methods of analyses, places and methods of sample-taking and all protective measures to be undertaken in the process of synthesis and in the case of analysis should be described.

(c) outline the problems occurring during the analysis of undeclared chemicals;

The inspection team is authorized not only to establish the declared production but also to find out whether any other chemical syntheses from listed Schedules (1), (2) and (3) can be made in declared facilities. For that kind of evaluation and analysis it is necessary to have a good knowledge or the principles of technological processes for the synthesis of other chemicals and of the special equipment required for the production of liquid and solid chemicals (reactor, distillation and crystallization vessels and equipment, measurement instruments, pipelines, etc.). Therefore, the inspection team should include chemical engineers, military experts, specialists in monitoring and measuring instruments and automation, and specialists in physical and chemical methods of analysis.

Furthermore, the inspection team should be equipped for taking samples directly from the reactors, air, soil and waste waters within the plant grounds or close to it. Extensive assistance of plant personnel is also expected in this context.

The ability and readiness of the facility for the synthesis of other chemicals is also established by inspecting the stocks of raw materials and reservoirs in the plant grounds.

All this indicates that it is essential to determine, during the negotiations at the Conference, the minimum data necessary to reduce doubts as much as possible about the possibilities for the violation of the Convention.

(d) reduce the possibility of any leakage of confidential commercial information;

As it was repeatedly pointed out during the negotiations, for the inspection to be successful it is necessary to take care of the protection of confidential information. Among them, commercial data and information on research and development work in an enterprise are considered to be the most sensitive. Therefore, it is necessary to determine and agree, in each particular case, which information represents a secret. This kind of information could possibly be given for inspection only to the leader of the team. Furthermore, it is necessary to determine the minimum information needed for the successful carrying out of the inspection. The minimum is determined during the process of inspection and with the assistance of the plant personnel, having in mind that the information given for inspection be sufficient for a realistic evaluation of the plant ability for declared chemicals production.

(e) limitation of the analyses of technological parameters;

Besides commercial information, information on the process of production can also be of a confidential nature. We consider that it should be of a less frequent case, but if it is necessary to classify some information as confidential, that has to be determined for each case separately. Regardless of all this, we consider that the leader of the team should also be given the above-mentioned information for inspection. The minimum of technological parameters for the successful conduct of the inspection is also determined with the assistance of the plant personnel.

(f) proposals of the standard form for data on the plant for the repo

Although it is clear that there are different plants and different processes of production of the same or similar chemicals, we consider that a successful conduct of inspection it is necessary to propose a standard fo both for submitting the applications regarding chemicals and facilities in plant and for the report submitted to the inspection team.

In Attachments 4 and 5 we give some examples of these forms illustrate with details of the production of phosgene in the plant which was the objec of inspection.

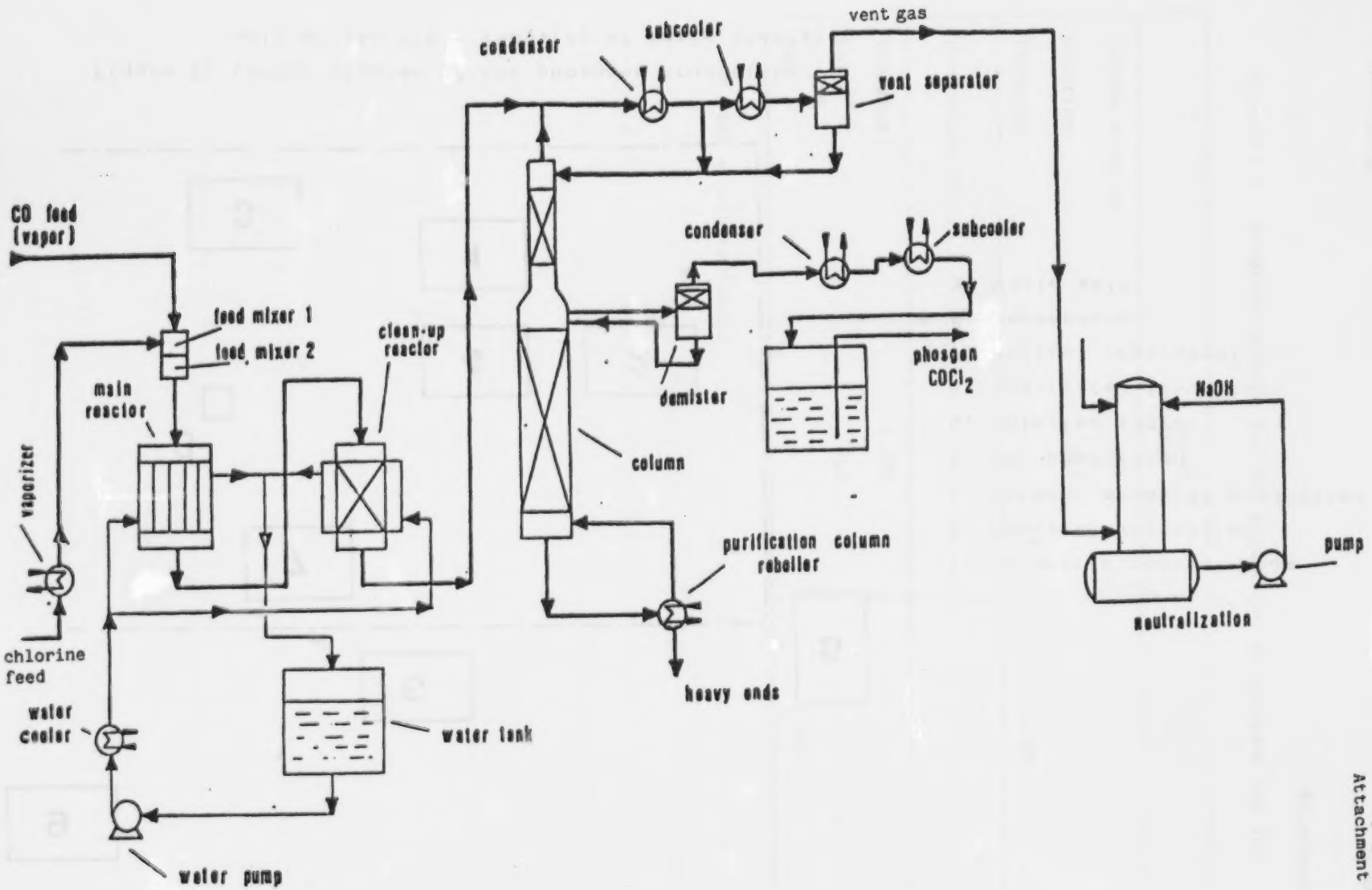
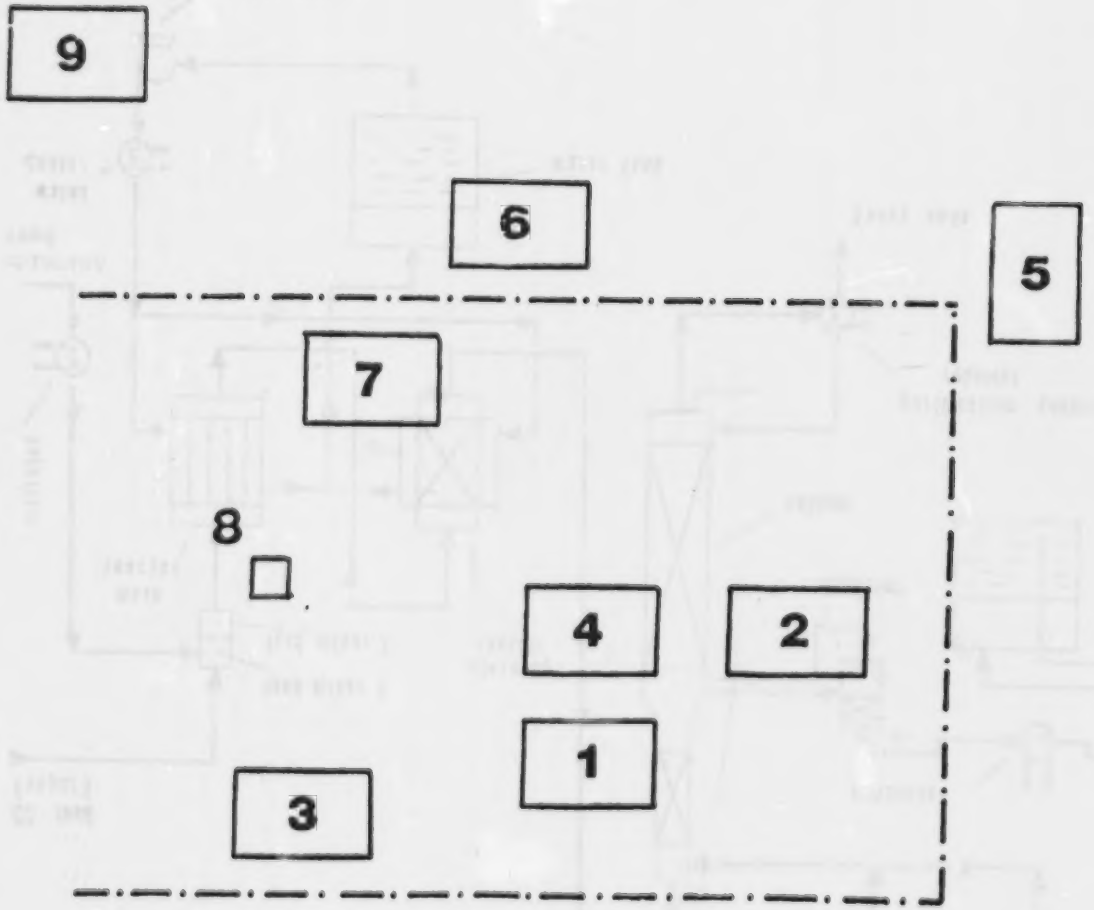


Figure 1. Process - flow-diagram for the production of phosgene



1. Automatic control room
2. Phosgene production
3. Carbon monoxide production
4. TDI production
5. Chlorine store
6. Analytical laboratory
7. Medical department
8. Incinerator
9. Waste water

Figure 2. Layout diagram of the phosgene production

Attachment 3

Schedule 1. Material balance for the production of phosgene and TDI

	input (kg)	output (kg)
Carbon monoxide	402	-
Chlorine	947	-
Phosgene	-	1 290
Production TDI		
Phosgene	1 290	-
TDA *	710	-
TDI	-	1 000

* TDA - Toluenediamine

unit of the PIB - industry of basic chemistry

Attachment 4

DATA ON CHEMICAL - SUBJECT OF INSPECTION

1. Chemical name, common or trade name, structural formula and Chemical Abstract Service Registry No.:

   Phosgene, Carbonic dichloride, Carbonyl chloride, Chloroformyl chloride

   $COCl_2$ CAS 75-44-5

2. Total amount produced, consumed, imported, and exported

   (a) The facility which is the subject of inspection is in the stage of production preparation: the predicted installed production is

   25 800 t/y

   (b) Total amount to be produced in 1990 is around

   6 500 t/y

   (c) There will be no exports nor transfer to other domestic industry

3. Purposes for which chemical is produced

   (a) Processed into TDI

   (b) There will be no exports nor transfer to other domestic industry

   (c) There is no export

Attachment 5

DATA ON FACILITY - SUBJECT OF INSPECTION

1. Name of the facility and owner, company, or enterprises operating facility

PIB - Industry of Basic Chemistry, BARIC-BEOGRAD

2. Exact location of the facility

BARIC-BEOGRAD

3. Whether the facility is dedicated to produce or process the listed chemical or is multi-purpose:

The facility is dedicated to produce only the listed chemical: Phosgene

4. Main orientation of the facility

The main orientation of the facility is the production of phosgene and TDI

5. Whether the facility can readily be used to produce a schedule (1) chemical or schedule (2) chemicals

The unit produces phosgene and cannot be readily used to produce any schedule (1) chemical or schedule (2) chemicals

6. Production capacity for the declared chemical(s)

The total production capacity of the unit synthesizing phosgene is

25 800 t/y

7. Which of the following activities are performed with regard to the chemicals?

(a) Production of phosgene
Phosgene 25 800 t/y

(b) Processing with conversion into another chemical
Phosgene is processed into TDI (20 000 t/y)

8. Whether at any time during the previous calendar year the declared chemical was stored

The facility is on trial production

9. Are there any reservoirs for raw materials and which ones?

   (a) There are three steel reservoirs of 100 m^3 each of chlorine, one of them is always empty (emergency tank)

   (b) There are three reservoirs of 16 m^3 each for phosgene exclusively to assure the continuity of the production of TDI, one is always empty (emergency tank)

10. Technology employed

   (a) Interaction of chlorine with excess of carbon monoxide in the presence of carbon as catalyst

   (b) Pressure in the main reactor: 5 bars

   (c) Temperature in main reactor 70°C

11. What facilities are there for the conversion of waste gases and waters?

   (a) Waste gases: neutralization and incineration

   (b) Waste water neutralization

PUBLICATIONS DEPT.

CONFERENCE ON DISARMAMENT

CD/983
CD/CW/WP.283
5 April 1990

Original: ENGLISH

Federal Republic of Germany

Report on the second trial inspection (challenge inspection) in the Federal Republic of Germany

Summary

At an earlier trial challenge inspection in an ammunition depot, the main emphasis had been on the significance of secondary indicators (see CD/CW/WP.278). The second trial inspection conducted in November 1989 on that basis served the principal purpose of obtaining for the first time data on the use of instruments under practical conditions. To this end, a military site with operational units was selected as a considerably more complex item for inspection.

It was demonstrated that, with the aid of random on-site checks and the use of currently available portable/transportable ultrasonics, radiography and mass spectrometry equipment, it is possible to dispel with adequate certainty the suspicion that chemical weapons are being produced or stockpiled, without sensitive information having to be disclosed.

However, depending on the number of samples and test items, the careful application of the procedures and equipment and the evaluation of the measurements may take more than 24 hours. Consequently, more efficient equipment and methods should be developed to meet the specific time requirements of a challenge inspection. In this respect, the United Kingdom's working paper of 12 January 1990 (CD/CW/WP.269) offers interesting ideas.

GE.90-60565

1. Aims

The main objective of the trial inspection, carried out on the basis of an unspecified suspicion of chemical weapons production or stockpiling, was to find concrete answers to the following questions through the practical use of instruments:

- Are the currently available ultrasonic or radiographical methods suitable for on-site, non-destructive categorization of ammunition?

- How many samples and what kind of samples can be adequately categorized on site with the aid of the mobile mass spectrometer?

- How much time is needed?

- Are three inspection assistants sufficient for the proper and efficient use of the instruments?

Furthermore, from the viewpoint of maintaining secrecy, the inspection was expected to clarify the question as to what extent the observer from the challenging country can be granted access.

2. Facilities inspected

The trial inspection concerned a military site where field artillery and NBC defence battalions are stationed. Two facilities were inspected:

- the joint barracks complex covering approx. 23 hectares and comprising an accommodation and medical area, a technical area with workshops and storage buildings, a training area, a heating station and heating oil store, a fuel store, open spaces with parked vehicles and diverse equipment;

- the associated ammunition storage site approx. 7 km away, which covers approx. 39 hectares and consists of ammunition

bunkers, equipment stores, workshops, administrative buildings and guard houses.

In keeping with its mission, the NBC defence battalion possesses special decontamination equipment, such as vehicles with tank superstructure and spraying device, stocks of chemical decontaminants and protective suits, as well as special equipment for the detection of chemical weapons.

3. Inspection team, observer, escort

The reinforced inspection team consisted of eight persons:

- two chemical weapons specialists responsible for the actual inspection activities,

- one expert on the forces inspected,

- two security experts responsible for checking the security measures of the unit inspected,

- three technical inspectors for carrying out checks with test and analysis equipment.

The team was accompanied by one officer acting as observer of the challenging country and by an in-country escort.

4. The inspection proper

The trial inspection, which was planned to last 24 hours, began with the arrival of the team at the facility to be inspected. After a short briefing, the inspectors asked questions, many of which were only answered after consultation with the in-country escort. This subsequently led to far-reaching demands by the inspectors.

Throughout the inspection, the observer made use of his right to suggest specific checks to the inspection team. He was given the same access and information as the inspectors. A restriction of his activities occurred when the inspection team

was temporarily divided into two groups in order to carry out parallel checks at different points. The observer was free to choose where to take part. For the sake of an efficient inspection, the team refused to carry out all checks one after another merely so that the observer would be able to observe all inspection activities.

During the random checking of the accommodation, administrative, medical and technical areas, the inspectors were permitted to examine the relevant files and regulations and to take samples from diverse containers for immediate analysis. Some ammunition and chemical bunkers and stores where selected for closer examination, the choice being made either arbitrarily or on the basis of hazard class markings.

For the physical determination of the contents of ammunition and containers without opening them or taking samples, use was made of an ultrasonic wall thickness tester, an electrostethoscope and radiographic equipment.

For the qualitative chemical categorization of chemicals found, a mass spectrometer was employed.

4.1 Physical examinations

When examining ammunition, the emphasis lay on ruling out any liquid chemical charges and distinguishing it from explosive ammunition.

The ultrasonic wall thickness tester was used to measure the wall thickness of ammunition. Since chemical warfare ammunition usually has thinner walls than explosive ammunition, such measurements permit conclusions to be drawn in this respect. These measurements were also needed to ascertain the correct exposure time for radiography.

The likewise portable electrostethoscope served to determine the presence of fluids. When ammunition is subjected to kinetic stress, the electrostethoscope permits the typical noise of the moving liquid to be detected. The sound waves generated are

picked up by a piezoelectric element, amplified and heard via a headset, provided that the probe of the stethoscope is in direct contact with the item to be examined. Radiography involving X-rays for the non-destructive examination of the internal technical structure was used to identify specific features of chemical warfare ammunition. The transportable X-ray unit (min. 300 keV energy) employed for this purpose requires a 220 V power supply, which was locally available. The exposed film material was developed in a nearby hospital.

4.2 Analysis of samples

A mobile mass spectrometer (MM1) installed in a vehicle was available for sample analysis. The instrument programmed for the detection of chemical warfare agents through selected ion monitoring (SIM) was, with the approval of the in-country escort, also employed for more intrusive examination of samples through the recording of partial spectra within relevant mass ranges and of spectral series. To confirm the identity of chemicals found, the samples taken were first checked by SIM for the absence of chemical warfare agents listed in schedule 1. Then they were identified on the basis of spectral series after being subjected to coarse separation both through fractional evaporation and through chromatographic effects in the diaphragm inlet system used.

The chemicals analyzed included perchloroethylene, ethanol, fuels and CS, which is used both for exercises and for testing of the tightness of gas masks.

For the examination of complex air and coating samples, it would have been necessary to convert the instrument and replace the inlet system by a gas chromatograph for greater sensitivity and selectivity. This was dispensed with for reasons of time.

5. Conclusions

The selected test and analysis equipment of the present state of the art can be successfully used for a challenge inspection. The considerable time still needed can be appreciably reduced

by increasing the number of instruments and of technical staff, by further routine in carrying out the examinations and by refining the processes and equipment, which should be specifically tailored to the time requirements of challenge inspections.

A challenge inspection, with respect to the use of test and analysis equipment, can generally be carried out all the more easily, the more precisely the suspicion giving rise to the challenge is described.

Even at this stage it is possible to ascertain the identification of relevant chemicals quickly, reliably and on the spot. A sample throughput of ten to twenty an hour can be achieved.

Careful examination of complex trace samples needs far more time. Even the taking and preparation of samples in this respect requires a lengthy period. Confinement to a few, carefully selected samples is therefore necessary.

Additional chemical screening procedures with a detection kit similar to that presented in the Netherlands working paper CD/CW/WP.271 can be used to advantage in this connection in order to select samples suitable for more extensive mass spectrometry.

In the present case, the inspection team did not have sufficient staff to develop an adequate basis of data within 24 hours.

In a future trial inspection a so-called "Gammamat" should be used for the radiographical examination of munitions involving gamma rays. This transportable unit, being independent on an external power supply, is expected to permit versatile operation even in confined spaces and the investigation of several items at the same time, thus improving the efficiency of the investigation to a considerable extent.

The trial inspection showed that it was possible to protect sensitive data and facilities, which exist at this site only in a limited number, even though the observer played a very active and challenging role, maintained a constant dialogue with the inspection team and enjoyed the same access as the team. It is not yet possible to generalize these results, because some military installations have far more sensitive data and facilities than the site inspected.

CONFERENCE ON DISARMAMENT

CD/984
CD/CW/WP.284
10 April 1990

Original: ENGLISH

FEDERAL REPUBLIC OF GERMANY

Ad hoc Verification: The Establishment of National Registers

In presenting its concept of ad hoc checks the delegation of the Federal Republic of Germany proposed the establishment of National Registers listing all relevant facilities of the chemical industry (cf. CD/869 of 6 September 1988). These registers to be provided by States parties to the Technical Secretariat were to serve as the basis for the selection of facilities to be inspected by ad hoc checks.

Detailed discussions on a possible ad hoc verification régime have subsequently taken place in Working Group 1 of the Ad hoc Committee on Chemical Weapons in the course of the spring part of the 1989 session of the Conference on Disarmament. These discussions also focused on the issue of National Registers and showed the need to further explore the conceptual approach to be taken in this regard.

With a view to providing a basis for further discussion the following concept of National Registers is suggested:

1. Purpose

National registers are to serve two purposes:

- First, National Registers will constitute a confidence-building measure as they are listing all relevant plant sites of the chemical industry world wide according to an agreed format.

- Second, National Registers will provide the declaration basis for the selection of facilities to be inspected by ad hoc verification measures.

The following discussion of the issue focusses solely on the latter purpose.

2. General considerations concerning National Registers as the declaration basis for ad hoc verification

Ad hoc verification measures are a complementary instrument their sole purpose being to verify on a routine basis whether, at the time of the check, substances listed in the Annex on Chemicals and not declared for facilities at the plantsite are being produced. As such they require - as the other routine verification measures of the Convention - a reliable declaration basis.

As National Registers are to serve this purpose, they have to be binding: In its National Register a State Party formally declares all relevant facilities of its chemical industry which will be subject to ad hoc verification measures.

Omissions and false information in the National Register will thus have to be considered as violations of declaration obligations. This notwithstanding it is understood that - in particular during the first years after the entry into force of the Convention - National Registers provided by States Parties may contain inaccuracies and unintentional omissions which will be due to technical difficulties in registering all relevant plantsites within a State in accordance with the proposed format. It is to be expected that also the other declaration obligations under Article VI might present some teething troubles, but that those will soon be overcome. Initial inaccuracies in National Registers will thus certainly not be considered serious breaches unless they prove to be intentional.

3. Requirements for National Registers

National Registers must be tailored to the purposes and needs of the inspection measure for which they provide the declaration basis. As ad hoc verification measures are to address the problem posed by the fact that existing facilities of the chemical industry can be misused for producing chemical weapons, National Registers are to provide a comprehensive picture of the relevant parts of the chemical industry. They have to list all facilities which can possibly be misused for the production of chemical weapons. As such a capability is hard to define unambiguously it is suggested that a broad approach be adopted. For this approach to be feasible and acceptable it has to be easily implementable by States Parties and at the same time it has to be ensured that confidential information is protected.

4. Suggested modalities for establishing National Registers

In order to meet the requirements described above the following approach to the establishment of National Registers is suggested:

- Each State Party shall provide to the Organization a National Register of its chemical industry.

- This register shall include all plantsites which produce discrete chemical compounds through technical processes based on chemical reaction(s), the total annual amount of this production exceeding [10] tonnes.

- Those plantsites which exclusively produce iron smelting products, cement, glass, ceramics shall not be subject to declaration (1).

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(1) Whether additional production areas are to be exempted from the declaration obligation needs further consideration.

Underlying the approach outlined in the three elements above is the basic criterion that only those plantsites shall be declared in the National Register that perform chemical reaction(s). For this purpose chemical reaction is defined as any transformation of chemicals where rearrangements of atoms, groups of atoms, ions or radicals of one or more substances (called basic or raw materials) result in the formation of new substances. Not included are physical processes such as crystallization, extraction, etc. Also not included are product formulation and mechanical processing of chemicals (2).

The plantsite is suggested to be the basic unit of registration in National Registers. The definition of this term as well as definitions of other pertinent organizational entities/structures in the chemical industry are set out in the Annex to this Working Paper.

5. Contents of the National Register

In order to enable a meaningful selection of plantsites to be inspected by ad hoc verification measures the National Registers should include information according to an agreed format. It is proposed that they include at least the following items:

- name of the plantsite and the owner, company or enterprise operating it,

- exact location of each plantsite

- main orientation of each plantsite

(2) As biochemical processes pose quite distinct verification problems, toxins are left out of consideration in this paper. It would seem that in general further in-depth consideration is needed as to how to cope with toxins in terms of verification.

- principal product groups (3) of each plantsite.

- size of overall annual production for each product group within ranges (10 to 100 tonnes, 100 to 1000 tonnes, 1000 to 10 000 tonnes, 10000 to 100 000 tonnes, above 100 000 tonnes).

6. Submission of National Registers

National Registers should be submitted by all States Parties [6] months after the entry into force of the Convention. Information to be provided under para. 5 should be updated annually at a fixed date (only changes as compared with the previous declaration to be reported).

7. National Registers and the conduct of ad hoc verification measures

Due to their non-intrusive character ad hoc verification measures provide for the possiblity of verifying a large number of facilities of a plantsite within a relatively short period of time. However, even if the plantsite is chosen as the basic unit of registration in the National Register, not all production facilities of a plantsite receiving an inspection in accordance with an ad hoc verification regime would be checked. Rather it could be envisaged that the inspection team, upon arrival at the site, would select one or more particular production facilities to be checked. In this way equality of obligations undertaken can be ensured (cf. different sizes of plantsites in different countries).

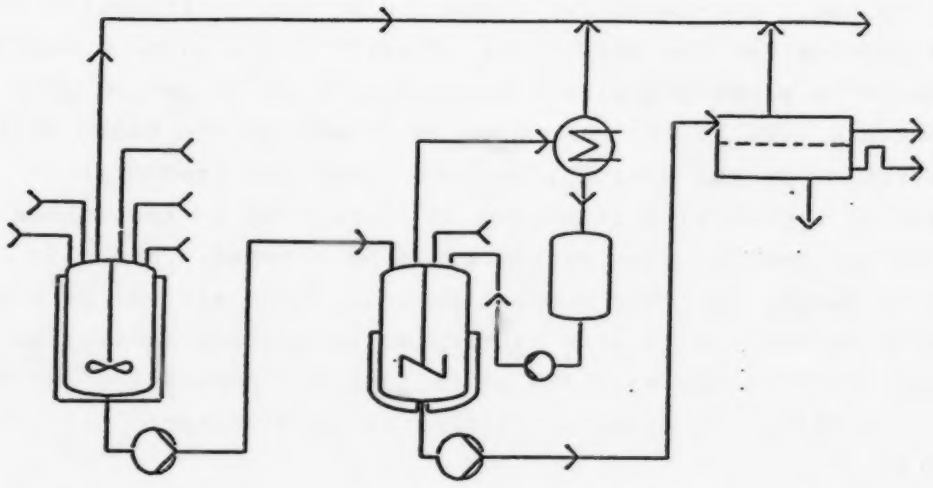
(3) Product groups could be pesticides, pharmaceuticals, dyes, pigments, etc. It needs to be discussed further what the categorization should look like also with regard to the requirement that the most relevant production/plantsites should be easily identifiable. In this regard it may e.g. be necessary to have "organophosphorous pesticides" as a separate product group.

A N N E X

The Definition of Facilities of the Chemical Industry

1. PLANT SECTION

A plant section for the manufacture of a chemical product ("product") is the means for operating individual process steps such as reaction, work-up, purification, etc. A process step can technically consist of



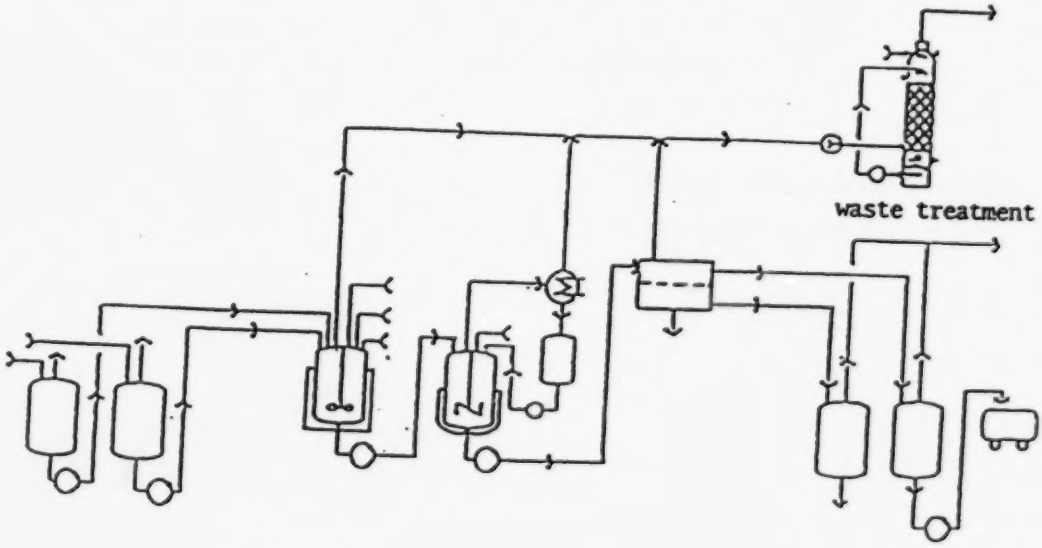
reaction work-up

several basic unit operations, i.e. the process step of purification can consist of the three unit operations crystallization, isolation and drying.

2. PRODUCTION PLANT

A production plant incorporates all necessary plant sections for the manufacture of a product such as reaction, work-up and purification. Also included are all necessary installations and equipment for process monitoring and control, tankfarm for raw materials, intermediates and final products and specific equipment for waste treatment.
Often the name of the product is used to identify a production plant, e.g. dialkylamin plant. Central installations serving several production plants such as central cooling systems and waste treatment, are not included in the definition of a production plant.

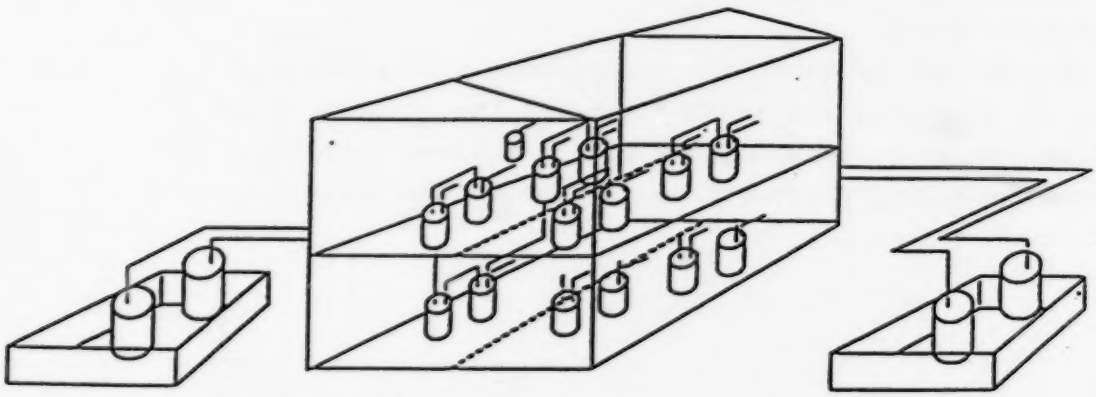
One main product or simultaneously several main products, resulting from one main reaction, can be produced in a production plant.
A different main product can be produced in a production plant by utilizing all or only some of the existing plant sections or by integrating new plant sections into the production plant. The reactions can be run batchwise or continuously.



tankfarm for raw materials | reaction | work-up | tankfarm for final product

3. PRODUCTION FACILITY

A production facility consists of independent or interrelated production plants including the necessary auxiliary plant, which are physically integrated in a production building or in an open steel structure.
The production plants, with regard to their products, can be operated independently, but have certain plant sections in common, such as specific waste treatment and tankfarms. They can also be linked in order to produce one final product.

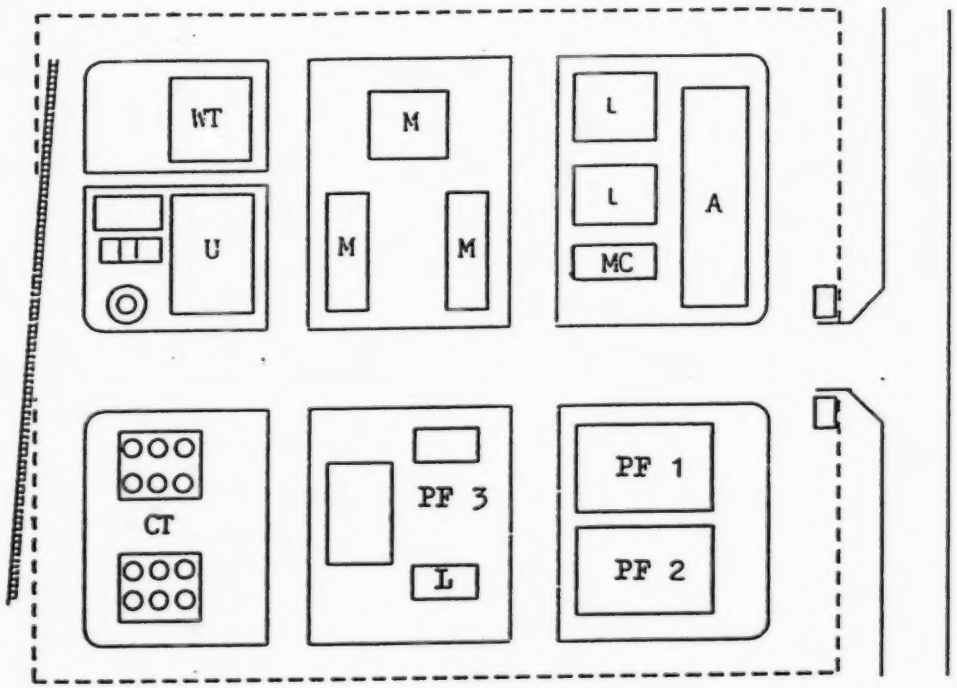


PP 1 PP 2

PP 1 = production plant 1
PP 2 = production plant 2

4. PLANTSITE

A plantsite is the local integration of one or more production facilities together with infrastructure, like maintenance shops, administration, medical center, central waste treatment plants and utility supplies.



PF 1 = production facility 1
PF 2 = production facility 2
PF 3 = production facility 3
M = maintenance shop
A = administration
MC = medical center
U = utility supply
WT = waste treatment
CT = central tankfarm
L = laboratories

CONFERENCE ON DISARMAMENT

CD/985
CD/CW/WP.289
17 April 1990

Original: ENGLISH

Ad hoc Committee on Chemical Weapons

POLAND

Provision of data relevant to the Chemical Weapons Convention

In order to contribute to the negotiations on the Chemical Weapons Convention, the Republic of Poland presents below data relevant to the future Convention in accordance with the format proposed in document CD/828 of 12 April 1988.

The data reflect the situation in Poland as at the end of 1989. The data on the production and/or use of chemicals relevant to the Convention were provided on a voluntary basis by the respective Polish bodies and institutions. The chemicals contained refer to the lists of the Schedules 1, 2 and 3 in document CD/952 of 18 August 1989. The thresholds for production and consumption were for Schedule 1 : 100 grams/per year, Schedule 2 : 1 tonne/year and Schedule 3 : 30 tonnes/year.

TABLE 1

Type of data	Response	Note
1. Presence of CW on own territory	No CW are located in the territory of Poland	
Possession of CW on territory of another State	No	
2. Aggregate number of facilities for the production and storage of CW	None	
Aggregate number of facilities for the production, processing and consumption of chemicals on Schedules 1, 2 and 3	8	1/
3. Types and names of CW agents	Poland neither produces nor possesses CW	
Types of CW munitions stored; CW agents stored in bulk	None	
Number and names of chemicals on Schedules 1, 2 and 3 produced in the chemical industry	6	2/
4. Plans and methods for the destruction of CW including the number of facilities and the anticipated length of their operation during the 10-year destruction period	None	

1/ Detailed information listed in table 2.

2/ The names of chemicals produced in Poland above the set level are listed in table 3.

TABLE 2

Detailed information on item 2 of table 1

Type of data	Annual quantity	Number of facilities
Schedule 1		
Production	more than 100 g but	1
Consumption	not more than 10 kg	2
Schedule 2		
Production	more than 1 tonne	None
Consumption	more than 1 tonne	None
Schedule 3		
Production	more than 30 tonnes	3
Consumption	more than 30 tonnes	5 */

*/ That figure contains three facilities producing Schedule 3 chemicals mentioned above.

TABLE 3

Schedule	Number of facilities	Produced chemicals	Note
Schedule 1	1	Mustard gas (H) (505-60-2) Lewisite	1/
Schedule 2	-	No	
Schedule 3	3	Phosgene (75-44-5) Hydrogen cyanide (74-90-8) Phosphorus trichloride (7719-12-2) Phosphorus oxychloride (10025-87-3)	

1/ The production of chemicals on Schedule 1 occurs in the Republic of Poland only for permitted purposes.

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CONFERENCE ON DISARMAMENT

CD/986
18 April 1990

Original: ENGLISH

LETTER DATED 18 APRIL 1990 ADDRESSED TO THE SECRETARY-GENERAL OF THE CONFERENCE ON DISARMAMENT FROM THE PERMANENT MISSION OF THE FEDERAL REPUBLIC OF CZECHOSLOVAKIA TRANSMITTING THE MEMORANDUM ON THE EUROPEAN SECURITY COMMISSION PRESENTED BY THE MINISTER OF FOREIGN AFFAIRS OF THE FEDERAL REPUBLIC OF CZECHOSLOVAKIA 6 APRIL 1990

I have the honour to enclose herewith the Memorandum on the European Security Commission presented by the Minister of Foreign Affairs of the Federal Republic of Czechoslovakia Mr. Jirí Dienstbier in Prague 6 April 1990.

I would kindly request you to circulate this Memorandum as an official document of the Conference on Disarmament.

(Signed): Juraj Králik
Ambassador
Head of the Czechoslovak delegation
to the Conference on Disarmament

GE.90-60736/6035A

CZECHOSLOVAKIA

MEMORANDUM ON THE EUROPEAN SECURITY COMMISSION

PRESENTED BY THE CZECHOSLOVAK MINISTER OF FOREIGN AFFAIRES IN PRAGUE 6 APRIL 1990

Political developments in the world, particularly, in Europe are unfolding with such speed that the existing institutions are no longer in step with them. After years of confrontation Europe finds itself at the start of a new stage. This gives rise to new possibilities but also to certain risks.

The security structure of the continent stemming from the post-war realities is still based on the principle of a balance of forces between the two blocs. Its foundations, however, are not solid because they rest on artificial dividing lines. The division of Europe in two parts, as well as the division of Germany in two States has outlived itself.

The sources of potential Europen conflicts are more heterogeneous than has until now been envisaged by the bipolar confontational system. From this follows the necessity of conceiving Europen security more broadly and of including in it, in addition to political and military, also economic, environmental and humanitarian aspects as well as the possibility of other threats. Such security, however, cannot be safeguarded by the existing confrontational security system, but only by a new European-wide structure of peace, stability and confidence. The profound political changes in Central and Eastern Europe add to the urgency of the need of such a modern structure.

The Warsaw Treaty and NATO operate today in different conditions than those in which they came into being. These organizations which until now have divided Europe should shift the focus of their activity primarily to the field of disarmament. We assume that further development will enhance their political role and will gradually tone down their military role. This process, at the same time, will not have to proceed symmetrically, since, in many aspects of their activities, the two groupings are not identical.

We believe that the best suitable basis on which to build a unified all-European security system is provided by the CSCE process to be heading with greater momentum in the direction of a second generation of Helsinki understandings. These should create the prerequisites for the gradual establishment of a common system of European security. The attainment of this goal calls for institutionalizing our joint efforts within CSCE and creating effective mechanismus of a new type.

A longer-term outlook of building a modern security system calls for making full use of the experience of the existing institutions of multilateral cooperation, such as the Council of Europe and others, which should gradually become European-wide.

Seeking new possible approaches, we proceed from the positive lessons learned so far in the CSCE process, as well as from the need to respond to the development in Germany and to the profound social changes in Central and Eastern Europe.

In keeping with purposes and principles of the United Nations Charter and of the Conference on Security and Cooperation in Europe, Czechoslovakia proposes, in the first stage, the establishment of a European Security Commission comprised of the participating States of the Helsinki process. Its justification is seen by us in the fact that it would provide an until now missing permanent all-European platform for the consideration of questions realting to security on the continent, and for seeking their solution. This European Security Commission would operate side by side with the existing two groupings and intependently of them.

The formation of an effective system of European security would in the second stage be facilitated by the establishment, on a treaty basis, of an Organization of European States, including the United States and Canada.

The third stage would culminate in a confederated Europe of free and independent States.

The European Security Commission would operate on the basis of consensus. It would initially fulfil consultative, co-ordinating and certain verification functions and, later on, such functions as would be agreed by the participating States. This would include, in particular, the following tasks:

- Considering international political correlations of European security and proposing the adoption of appropriate measures;

- Forestalling threats to European peace and security, the rise of exacerbated situations, disputes, military incidents and conflicts and recommending as well as offering means of their settlement (good offices, mediation, fact finding, conciliation, etc.);

- Dealing with questions of threats to, and violations of, security that are due to economic, ecological and humanitarian causes and assume large proportions and have international implications;

- Creatin a scope for direct contacts and negotiations of the two groupings and their members, attended, if need be, also by the European neutral and non-aligned countries;

- Commenting on the conduct of negotiations by the European disarmament and security forums and proposing their furthe orientation;

- Considering the possibilities of expanding the agenda of the existing disarmament forums and the establishment of new ones;

- Considering reports by verification and consultation centre on compliance with European arms control and security agreements;

- Informing each other on doctrinal, structural,organizationa and budgetary changes relating to the armed forces of the participating States and on the introduction of new weapo systems by them;

- Informing the United Nations as well as regional organizations on the results achieved in the sphere of European disarmament and security.

The Commission would meet at the level of Ministers of Foreig Affaires and their Permanent Representatives. Regular sessions a the level of Ministers would be held at least once a year Extraordinary sessions could be convened at the request o participating States.

Sessions of Permanent Representatives would be held once month or more frequently if so requested by a participating State

Subordinated to the Commission would be a Military Committe composed of military representatives of the CSCE participatin States. It would be meeting at least once a year and would dea with questions specified by the Commission. For the purpose of th implementation of its tasks the Commission may establish auxiliar bodies. The necessary technical services for the Commission woul be secured by a not very sizable, operative, permanent Secretariat

Czechoslovakia offers Prague as the permanent seat of th Commission. At the request of the participating States th Commission could also meet alsewhere.

The forthcoming Summit of the 35 participating counties, whic will consider important questions of the further development o security and cooperation in Europe, could adopt a decision o creating organizational prerequisites for the establishment of th Europen Security Commssion as a nucleus of a new security structur on the continent.

Czechoslovakia, for historical, political-strategic and other reasons, has an eminent interest in the creation of such a structure. While drafting our proposal, we took into account the suggestions which have so far been submitted by the other CSCE participating countries and which came close to our concept of European security. This proposal is open to discussion.

The dynamic development on the continent creates conditions for various aproaches to the shaping of all-European structures and their appropriate mechanisms. However, the goal should be to create a new, sufficiently flexible and future-oriented model of European security.

Such development should be in the interest of not only Europe but of the whole world.

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Prague, 6 April 1990

CONFERENCE ON DISARMAMENT

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CANADA

National Trial Inspection at a Single Small-scale Facility

A. INTRODUCTION

During 1989 various countries carried out trial verification inspections on a national basis in their civilian chemical industry and reported the results to the Conference on Disarmament. The majority of these trials simulated routine inspections of chemical plants preparing key precursors currently listed on schedule 2A of the draft Convention on Chemical Weapons. More recently, some states, including the United Kingdom (CD/921) and the Federal Republic of Germany (CD/950), have reported trials of other types of inspections, such as challenge procedures and ad hoc verification and others are underway. Continuing this trend, Canada carried out in November 1989 a practice inspection at a simulated single small-scale facility (SSSF) where small amounts of schedule 1 chemicals have been prepared for protective purposes. The facility used for the trial is located at the Defence Research Establishment Suffield (DRES) in Alberta.

Canada does not possess any production facilities for chemicals currently listed on schedule 1. If such chemicals are needed, they are prepared in a standard organic synthesis research laboratory of the type found at many universities and research institutes. The research laboratory at DRES does not have any large reactors or permanently installed process equipment. Its capacity is limited to bench-scale synthesis. Such a facility would not pose the same threat to the goals of the chemical weapons convention as would a dedicated facility with larger production equipment, perhaps a pilot plant for which the model agreement provisions of the draft Convention (CD/952) seem to have been written. Thus the designation of the DRES laboratory as a single small-scale facility required a specific definition and careful adaptation of the procedures needed for routine inspections.

This working paper presents the results of a Canadian practice inspection held at the DRES research laboratory, part of which was defined as a single small-scale facility for the purpose of this trial.

B. GENERAL APPROACH

1. Aims and Objectives

The practice inspection provided an opportunity to examine and develop inspection procedures as a contribution to the work of the Conference on Disarmament. In addition, it was possible to explore the impact of such inspections on national programs, particularly those involving research into chemical protection, such as are carried out at the Defence Research Establishment Suffield.

The basic aims of the practice inspection were to evaluate the approach to verification at a single small-scale facility as outlined in the then current version of the rolling text (CD/952), to develop its application to a laboratory facility, to determine the problems created for the facility by the verification requirements, and to assess its applicability to this type of facility.

Specific verification objectives of the inspection were to demonstrate:

a) that the declarations made with respect to the facility were consistent with the obligations of the convention.

b) that the quantities of schedule 1 chemicals produced, stored, transferred, or consumed were within the prescribed national limits of 1 metric tonne; and

c) that the reaction vessels used in the facility were not designed for continuous operation and were of a volume not in excess of [10] [100] litres.

The Canadian trial simulated a routine periodic (annual) inspection. It was assumed that previous declarations, agreements, reports, etc., were available. Wherever practicable, this background information was simulated.

2. Relevant Provisions in the Draft Convention

The practice inspection was planned according to the provisions of Annex 1 to Article VI of CD/952, in particular those provisions pertaining to production at a

single small-scale facility. The model for an agreement relating to single small-scale facilities in Appendix II of CD/952 formed the basis for arrangements with the laboratory on access, assistance and additional information to be obtained. Guidance on inspection procedures was obtained from the guidelines for the international inspectorate in the Addendum to Appendix I and the draft protocol on inspection procedures in Appendix II.

3. Identification of the Single Small-Scale Facility

The simulated single small-scale facility involved in the practice inspection was defined as a single research laboratory located in a secure, specially ventilated suite within the main laboratory building at DRES. It was a standard organic synthesis laboratory equipped with five commercially available fumehoods with separate filtration and ventilation systems and a sixth fumehood specifically equipped for the secure storage of highly toxic chemicals. Associated supply systems, external storage areas, ventilation stacks and waste disposal areas were included in the facility description.

4. Type of Inspection

Examination of the provisions of the draft CWC suggested the following sequence of verification events for a single small-scale facility after entry into force of the Convention:

a) initial declaration of the single small-scale facility within thirty days;

b) initial inspection;

c) preparation of the facility agreement;

d) submission of the initial inspection report;

e) annual declarations of projected activities at the facility;

f) annual declarations of activities at the facility in the previous calendar year;

g) advance notification of changes to the facility;

h) routine periodic (annual) inspections; and

i) submission of inspectors' reports on routine inspections.

5. Initial Declaration

A simulated initial declaration was provided by the facility. This comprised: the location and detailed technical description of the facility required by Annex 1 to Article VI; a statement of the quantities of schedule 1 chemicals possessed as of the date of entry into force; and a list of schedule 2A chemicals and their quantities maintained as precursors for schedule 1 synthesis.

6. Initial Inspection

An initial inspection was not held prior to the trial. Instead, a planning group representing the facility, the inspectors, and the National Authority developed the required information over a two-day period prior to the inspection.

7. Facility Agreement

The necessary elements of the facility agreement were worked out during the planning session using as a basis the model for an agreement relating to single small-scale facilities, as outlined in the rolling text (CD/952).

8. Annual Declarations

Prior to the trial, a simulated annual declaration was issued. This was a relatively short document involving a simple update of the information provided in the initial declaration. As a result, material balance verification was straight forward, requiring only the addition of changes resulting from activities between the date of the annual declaration and the inspection.

C. DETAILED APPROACH

1. Dates and Duration

The trial was held during the third week of November 1989 and lasted two-and-a-half working days.

2. Mandate

The mandate for a routine inspection of the single small-scale facility was based on the elements of the facility agreement worked out during the planning session.

3. Composition of the Inspection Team

The inspection team was composed of a representative of the Department of National Defence as team leader, a representative from Canadian industry, and five scientists with a variety of backgrounds and experience. At least two of the inspectors were experienced in the preparation of schedule 1 chemicals, one was a practising analytical chemist, and two were widely knowledgeable in negotiations on the draft Convention.

4. Other Participants

The practice inspection was carried out under the direction of a senior scientific officer assigned from the Department of National Defence. He also played the role of a representative from the national authority and participated as an observer. There were also observers from the Arms Control and Disarmament Division of the Department of External Affairs and from the Arms Control Verification Team of the Department of National Defence.

5. Advance Preparations

In addition to the planning meeting, the inspection team was briefed at a half-day meeting the week before the inspection. All relevant material was supplied to the inspectors and observers in advance. This included information from CD/952 and examples of national trial inspection (NTI) reports previously presented to the CD. This material was discussed at the half-day briefing session.

Accommodation, meals and local transportation were arranged by the facility, and a small conference room was provided as a base of operations for the inspectors.

6. Inspection Equipment

All equipment used in the practice inspection, including photographic and safety equipment, was provided by the facility.

7. Measures to Protect Classified Information

Inspectors were treated in a fashion similar to any visitors to the establishment. They were escorted during all movements within the facility. It was not found necessary for the inspectors to have classified information in order to carry out the inspection. It was also not necessary to remove any equipment from the facility prior to the inspection or to shroud any items. The laboratories were left in their normal working state with no special clean-up prior to the inspection. The inspectors generally met and spoke only to those officially involved in hosting the inspection, providing services, or operating the specific facilities inspected.

8. Opening Conference

An opening conference of one-hour duration was held to provide background briefings in order to familiarize all participants with essential aspects of the practice inspection, as well as to update the declarations and answer questions from the inspection team.

9. Orientation Tour

As this was the first visit to the facility by some of the participants, a thorough tour of all areas of the facility, including remote storage and waste disposal sites, was provided for all inspectors and observers. Due to the distances to the remote sites, over four hours was required. At the end of the tour, an inspectors' meeting was held, at which initial plans were reviewed and revised and assignments made for more specific investigations by groups of inspectors.

10. Preparation Facilities

The preparation facilities for synthesis of organic chemicals were closely examined. There were five fumehoods within the single small-scale facility suitable for toxic synthesis at the levels of schedule 1 chemicals, although it was claimed that only two would normally be used for this work. An additional nine similar individually ventilated hoods were found to be present in other areas of the establishment, although not all had quite the same protective capability. It was clearly observed that systems for continuous operation were not available and that all reaction vessels used in synthesis within the facility were less than ten litres in size. In fact, for safety reasons, glass reaction vessels were normally restricted to five

litres or less, and those used in supertoxic lethal chemical or schedule 1 preparations were restricted to two litres or less in size.

11. Records Audited

The records examined included those showing the preparation, storage and transfer to research programs of all schedule 1 chemicals. Precursor inventories were also examined, as were purchase records relating to operation of the facility.

12. Sampling

Two samples were taken and analyzed in order to test procedures. One was from a container of a schedule 1 chemical in storage and the other from a container of decontaminated waste.

13. Analysis

A wide range of automated analytical techniques were available at the establishment, including infrared, gas-liquid chromatography, high-pressure liquid chromatography, nuclear magnetic resonance spectroscopy and mass spectroscopy. The analytical facilities of the establishment were not included in the single small-scale facility as defined for trial purposes, but full access was provided to inspectors as specified in the facility agreement. The complete range of analytical procedures was made available for use by the inspectors as required. The two samples were analyzed using gas chromatography/mass spectroscopy (GC/MS) and spectra were compared with electronically stored libraries including the NBS library and data from the Finnish blue books. Sampling and analysis of each sample took approximately one hour.

14. Documentation of the Inspection

Still photographs were taken by DRES personnel as required by the inspectors. The photographs included most operations carried out by DRES for the inspectors, e.g. sampling, sample transportation and analysis. Photographs were also taken at the remote locations.

15. Closing Conference

A brief evaluation of the trial involving all participants was held during the closing conference. All outstanding questions were resolved.

16. Anomalies

A few minor discrepancies were identified during the practice inspection, but all were easily resolved. None were deliberately introduced.

17. Report of the Inspection Team

The inspectors' report was largely prepared during the inspection. Some general sections were written by the team leader at the operations base as the inspectors were carrying out specific tasks. Other items were contributed by the groups of inspectors that carried out various aspects of the inspection. The draft report was reviewed by the inspectors prior to departure, with final editing occurring off-site the following week.

18. Impact on Facility Operations

Preparation time for the facility, including planning sessions and preparation of declarations, was spread out over several months and involved mainly the efforts of a single staff member. The practice inspection itself occupied a cross-section of facility personnel for three days and involved the shut-down of a number of programs for the same period. Monetary costs associated with the inspection for the facility were not estimated.

D. RESULTS

1. Definition of the Single Small-Scale Facility

Since a pilot plant or other dedicated production facility for schedule 1 chemicals is not used or available in Canada, the section of the research laboratory at the Defence Research Establishment Suffield used for synthesis of organic chemicals, including schedule 1 chemicals, might have to be identified as a single small-scale facility for purposes of the chemical weapons convention. A description of a single small-scale facility based on this laboratory was prepared following the provisions of the rolling text

(CD/952), but some difficulties were encountered in adapting it to verification procedures.

The laboratory is not used exclusively for the preparation of schedule 1 chemicals. It is a multipurpose organic synthesis laboratory. A wide range of synthetic projects, including the preparation and purification of precursor chemicals, is normally carried out there. The activities of the laboratory also include, however, those which could be considered as functions of an SSSF - i.e., the preparation of schedule 1 chemicals. Thus, it was not possible to isolate the single small-scale facility from these other functions.

No schedule 1 chemicals are prepared within the facility at DRES for other than protective purposes, and none have been transferred out of DRES to other locations, either nationally or internationally. Schedule 1 chemicals prepared in the facility have been transferred, however, to other areas of the establishment for consumption in research programs on chemical protection. For trial purposes, and in keeping with the apparent intent of the rolling text, the remaining sections of the DRES research establishment were not included in the declared single small-scale facility. It might be noted that, if a research laboratory such as that at DRES is declared an SSSF, then movement of schedule 1 chemicals for use in other locations in the research establishment can be considered as a transfer.

In applying the model for an agreement relating to single small-scale facilities to the laboratory setting, it was found that some sections of the model could be adapted without difficulty, while others could not. In many ways, the model was more appropriate for a dedicated facility housed in a separate building.

For instance, in the model under section 1(b), "detailed technical information", requirements for site information including pipework, roads, fences, mains electricity, water and gas points did not apply to the synthesis laboratory, nor did nearly all of the flow and process information requested. The provision of lists of equipment for a laboratory filled with research items was found to be very difficult and, in any event, was judged to be of little use for verification. (Glass reaction flasks, common to all organic laboratories, are expendable items and are not normally recorded in inventories.) In addition, the projected use of monitoring systems, while possibly having some value in a dedicated facility, was judged to be of no value whatsoever in a laboratory where a wide variety of similar but unrelated activities are being carried out. As a result, these sections of the model were disregarded during planning for the trial inspection.

The experience of this practice inspection clearly showed that the characteristics of a single small-scale facility, as set out in Annex 1 to Article VI, and particularly as augmented by the model for an agreement relating to single small-scale facilities, need further clarification for organic research laboratories not dedicated solely to the production of schedule 1 chemicals.

2. Facility Agreements

The contents of a facility agreement were found to be of utmost importance. It must not only contribute to the mandate for the inspection but also spell out rights of access, use of equipment, special inspection procedures, sampling and analysis, rights and privileges of both the facility and the inspectors, emergency measures, etc. It must even direct administrative arrangements, including transportation, meals and accommodation. Guidelines to the preparation of these agreements must therefore be quite clear, and a considerable level of detail must also be included if disputes are to be avoided.

Due in large part to difficulties in adapting the model provided in Appendix II to CD/952 to a laboratory facility, a complete facility agreement was not written for the practice inspection, and some disagreements over detail arose during the trial. The preparation of the agreement will involve considerable negotiation among the inspectorate, the facility management and the National Authority, and could be a time-consuming process. It must be initiated and largely completed at the initial inspection or at subsequent additional visits arranged specifically for this purpose. Until an agreement is signed, subsequent routine inspections will be unnecessarily difficult.

During the preparation of the facility agreement, it was thought useful to transform the models for an agreement into pre-prepared, standardized forms, which could be filled out, as appropriate, during initial inspections to make the work of the inspectors easier. An attempt was made to do this for the single small-scale facility model and seemed to work well. However, in order to make the form complete, some details not found in the model had to be added.

3. Declarations

During the preparation of declarations for the practice inspection, it became apparent that some difficulties exist in the declaration requirements for single small-scale facilities found in Annex 1 to Article VI. At present, there is no requirement to provide

information on the schedule 1 chemicals or their scheduled precursors that are stored at the single small-scale facility at time of the convention's entry into force. It was found that such data are essential in order to provide a baseline for the initial inspection. This would assist in negotiating a facility agreement rapidly, especially regarding requirements for access, frequency of inspections and other aspects of the agreement. The initial declaration should provide most of the information currently required in annual declarations.

In addition to the annual declaration of the previous year's activities after the end of the calendar year, Annex 1 to Article VI requires a separate declaration prior to the end of the calendar year regarding projected activities and anticipated production. The value of this process for a research laboratory is hard to assess because of the difficulty in predicting the needs of research programs for a year in advance. Such information will be inaccurate at best. But it could give rise to apparent anomalies during inspections, leading to unnecessary disputes. This declaration, then, was judged to have no value in the practice inspection, and it is difficult to perceive how such information would assist in verification, except possibly to suggest a need for a change in the frequency of routine inspections. The requirement for this declaration should be deleted for a laboratory facility. Alternatively, a projection of yearly activities and production quantities could be added to the declaration of activities for the previous calendar year, with the understanding that such projections are subject to change.

Finally, a requirement to declare formally the intent to operate a single small-scale facility should be added to the initial declaration in order to make this process complete.

4. Frequency and Duration of Inspections

In a facility where schedule 1 chemicals are produced for legitimate purposes, there will be no need to verify their presence or absence. A similar situation will hold for their precursors. Verification activities will concentrate primarily on confirmation of data contained in the declarations and that the facility is not capable of producing much more than one metric tonne of schedule 1 chemicals per year. In a laboratory adapted to the functions of a single small-scale facility, schedule 1 chemicals will probably be prepared only when needed. The quantities produced should not significantly exceed requirements, and thus the amounts retained in storage could be quite small. The threat posed by such facilities to the Convention should be insignificant, and frequent inspections will not be

necessary in the absence of other information that might increase the level of concern. The Canadian experience would suggest that annual inspections should be appropriate for this type of facility. Only when quantities approach the one metric tonne limit should more intense verification measures be considered.

After the initial visit has been carried out and a facility agreement completed, verification activities during subsequent routine inspections at a laboratory-type single small-scale facility should be straightforward and brief. Although the practice inspection took two-and-a-half days to complete, much of this time was required because activities were being attempted for the first time. It was estimated that a repeat inspection could be carried out in one working day or less by a team of experienced inspectors.

5. Travel Time

For the practice inspection, the inspectorate was not required to bring equipment so that travel by commercial transport was considered to be appropriate and cost effective. Most of the inspectors left their homes in Eastern Canada early in the morning (equivalent to point of entry), used a commercial flight to Calgary, and then proceeded to Medicine Hat by ground transport provided by the facility. Arrival was late in the afternoon. No inspection activities were possible during the evening and night hours when the facility was closed. The inspection officially commenced the following morning after the opening meeting. The time period from departure in the East to initiation of the inspection was about twenty-six hours. This was under good conditions, with no delays en route (although the road from Calgary was closed by a snowstorm shortly after the inspectors had passed). Few other timing options were available using commercial air travel; a reduction of the time involved would have required night time travel, highly expensive dedicated aircraft, or night operations. This experience illustrates the difficulty in attempting to adopt procedures designed to shorten the warning time for surprise inspections and the potentially high costs of such measures.

6. Inspection Team

A total of seven inspectors were utilized for the practice inspection. This was a larger group than would normally be needed for a routine annual inspection at a single small-scale facility of this type following completion of the initial inspection and the inspection agreement. Five inspectors would be adequate, or even four if the team leader could also act as an inspector. The

development of standard formats for reports would help ease the burden. It was agreed that inspectors should operate at least in pairs in order to provide corroboration of all observations, although the team leader could pursue some functions alone at the operations centre.

For the inspection of a single small-scale facility, the practice inspection showed clearly that the inspection team must possess a variety of skills. At least one must be highly knowledgeable in sampling and analytical techniques, and one or more should be thoroughly trained in areas related to record keeping, bookkeeping and purchasing procedures. Others should be skilled in organic chemistry or in process engineering. Knowledge of general practices in organic synthesis laboratories is essential, and similar knowledge about pilot plant processes would be desirable.

The inclusion of support services with the inspection team must be considered. During the practice inspection, all such services were provided by the facility. However, in a real international inspection, this may not be possible or desirable. It could be necessary to have interpreters as part of the inspection team. The inspectors should have the authority to record photographically or otherwise the inspection process, and portable computers should be available to prepare records and reports.

Guidelines for the composition of inspection teams in terms of numbers, skills, training and experience should be worked out during the preparation period.

7. Inspection Equipment

The practice inspection indicated that very little equipment would be needed for routine inspections at a single small-scale facility. If the facility is located at a laboratory, adequate analytical facilities and safety equipment should be available. The trial showed that such facilities and equipment could successfully be used for verification so long as a proper relationship exists between the inspectors and the facility. Requirements would be determined at the initial inspection and spelled out in the facility agreement. Photographic and video equipment must be under the control of the inspectors and may have to be brought with them. A portable word processing system and small printer for preparing reports would also be useful.

8. Security of Information

During the practice inspection, there was no hesitation on the part of the facility management to allow access by the inspectors to all areas relevant to

verification of the single small-scale facility, including neighbouring laboratories with similar fumehoods, roof stacks, waste disposal areas, analytical facilities, storage facilities and remote field sites. The tour and other inspection procedures involved a thorough examination of the areas visited; however, because it was a typical laboratory, there was little to be seen that was unique or sensitive, and the consequences of these intrusive measures were not found to be controversial.

Photography was found to be most important for recalling observations; however, in some states or facilities, photo and video records may be considered sensitive if taken outside the facility. It may be necessary to store such records at the facility in secure sealed cabinets between inspections, but they would normally be most useful to inspectors during preparations for the next inspection. Arrangements with the facility management for the handling of photographic records must be included in the facility agreement.

Generally little or no classified information was found to be exposed during the practice inspection of the simulated single small-scale facility. No classified commercial information was involved. (The main point at which classified information could have been divulged would be through examination of the purposes for which the schedule 1 chemicals prepared in the facility were used.)

9. Production Capacity

The determination of production capacity was found to be a key element in verification at the facility. In practical terms, the factors which limit the quantities of schedule 1 chemicals made in a synthesis laboratory are the number and quality of the fumehoods and the size of the reaction vessels that can be used in them. From information provided in the initial declaration, and given the safety regulations in force, it could be calculated that the maximum yearly production from a full-time, dedicated process in the facility would be no more than sixty kg per fumehood. It was apparent that this type and size of facility was not a significant threat to the objectives of the Convention. Further verification then became a simple matter of confirming the data provided in the declarations.

With reference to Annex 1 to Article VI and the size of reaction vessels, the capacity of vessels used in a research laboratory-type facility could easily be restricted to ten litres, although the DRES facility uses vessels of considerably smaller capacity. Typical pilot plant vessels, as might be used in a dedicated facility, however, can range up to several hundred litres. A one-hundred-litre limit

imposed on them might be inconvenient, but it could probably be accepted. A facility with vessels of this size would pose a much more serious risk to the Convention, especially if several such vessels were available. Inspections would need to be more frequent and at unpredictable times with a minimum of warning. Sampling and analysis of waste products could become important for verification. The purchase or possible synthesis of precursors would have to be monitored carefully. A trial of a dedicated single small-scale facility, possibly a pilot plant, should one be available somewhere, would be most useful in testing these factors.

10. Production Quantities

Perhaps the most useful means of monitoring production quantities would be through inventory control of precursor chemicals. As most precursors are obtained from commercial sources, all schedule 1, 2 or 3 precursors coming into the facility should be identifiable by quantity and lot number. Usage of these precursor chemicals at the facility should be recorded by lot number, quantity and date. A similar record should be maintained by the facility when precursor chemicals are prepared on-site or obtained from non-commercial sources. These procedures would allow a running balance to be maintained, and the information could be compared with data from commercial sales. In industry, a system of audit trails for chemicals is normally required by law; similar procedures could be required for single small-scale facilities under the chemical weapons convention. In view of the adoption of Laboratory Information Management Systems (LIMS) by industrial laboratories, this might form a model for a system to be used in single small-scale facilities as a means of aiding verification.

11. Sampling and Analysis

During the practice inspection, it became apparent that the taking and analysis of samples at a single small-scale facility may add little useful information to the verification process. Schedule 1 chemicals and their precursors were legitimately present and required only a few random checks to confirm their identity. However, it was considered essential that the inspection team retain the right to have any sample it wished analyzed, either on-site or at a designated laboratory. Procedures for sampling and analysis must be clearly spelled out in the facility agreement.

One possible role for sampling at a single small-scale facility would be to demonstrate, by the analysis of waste products and possibly air and soil samples, that larger quantities of undeclared schedule 1 chemicals had not

been prepared recently at the site. For instance, it was observed that waste water from DRES (including that from the single small-scale facility) was delivered directly to an isolated two-pond lagoon purification system. While samples were not taken from the lagoon during the practice inspection, it was estimated that analysis of the water would likely show the presence of degradation products if militarily significant quantities of schedule 1 chemicals were being prepared in the facility. Baseline measurements, however, would be required.

All sampling and analysis for the practice inspection was carried out by facility personnel. To overcome the possibility of deception, an identifying "spike" was added by the inspectors and the process observed continuously. Thus, if done with care, samples can be taken and accurately analyzed by the facility. However, it was also quite apparent that without the presence among the inspectors of an analytical chemist thoroughly knowledgeable in the techniques and equipment being used, the inspectors would not have been aware of any inaccuracy in the analytical results, should the facility scientists have attempted a cover-up.

This problem might have been partially overcome by the removal of samples to neutral off-site laboratories for analysis. Apart from the extra skills, time and effort required, the transport of highly toxic samples is a hazardous process and should be avoided if possible. Nevertheless, there must be the capability for removal of samples off site. Analytical equipment could have also been brought to the site by the inspectors, but this should be done only if cost effective. This would seem to be unlikely for the few samples that may be needed during a routine inspection of a single small-scale facility. The use of analytical instruments belonging to the facility would appear to be the best option despite the opportunities for deception.

12. Inspection Report

An extensive inspection report did not appear to be needed, at least insofar as routine verification of a single small-scale facility of this type is concerned. The initial report might be more extensive, but once it is agreed that the facility is in compliance, for subsequent annual inspections, reports should deal mainly with confirmation of declared data and the effects of any changes at the facility. In most instances, it should be possible to report on these in a few paragraphs.

Inspectors, as they gain experience, can be expected to develop standard formats to shorten the

reporting process. This should, in most circumstances, allow completion of reports before the inspectors leave the facility. It should be possible to arrange a series of trial inspections at various types of sites so that the newly formed international inspectorate can gain experience and work out the most suitable approaches to procedures, the preparation of reports, and the development of facility agreements.

E. CONCLUSIONS AND RECOMMENDATIONS

The Canadian practice inspection successfully demonstrated the feasibility of carrying out routine verification inspections at a single small-scale facility preparing schedule 1 chemicals for protective purposes without compromising sensitive or secure facilities, equipment or operations. All aims of the trial were achieved, although some difficulty was encountered in adapting the single small-scale facility model to a research laboratory site. The practice inspection was sufficiently realistic to test the practicality of inspection procedures, and the results provide excellent guidance for further negotiation of the draft Convention on Chemical Weapons. A number of factors emerged that illuminated practical features of the inspection procedures. Some of the results bore directly upon entries in the current rolling text (CD/952), suggesting useful modifications and improvements.

Based on the results of the Canadian practice inspection, the following recommendations can be made for changes or improvements in procedures that may affect the rolling text.

a) The characteristics of a single small-scale facility set out in Annex I to Article VI and developed further in the model facilities agreement in Appendix II are not entirely appropriate for a facility which consists of a multipurpose organic synthesis laboratory. Further trials of such facilities are required, especially at dedicated sites, and the model for an agreement relating to single small-scale facilities should be reviewed. Pre-prepared forms for facility agreements could simplify the work of inspectors and should be developed.

b) The proposed installation of on-site monitoring systems, while perhaps having some value with respect to a dedicated synthesis or pilot plant facility, is not relevant to a multipurpose laboratory facility. This concept should be reviewed as to its being mandatory.

c) The initial declaration for a single small-scale facility should include a declaration of intent to operate such a facility, as well as most of the information

currently required for annual declarations. In particular, it should include a statement of the quantities of schedule 1 and schedule 2 chemicals possessed as of entry into force of the Convention, in order to provide a basis for the initial inspection and preparation of the facility agreement.

d) The requirement to submit annually a separate declaration regarding projected activities and anticipated production is unnecessary for a multipurpose laboratory facility. This provision should be modified.

e) A laboratory-type single small-scale facility would pose a much less serious risk to the Convention than a dedicated facility and would therefore require less frequent inspection.

f) Guidelines are required for the composition of inspection teams in terms of numbers, skills, training and experience. These should be worked out during the preparation period.

g) The most useful means of monitoring the quantities of schedule 1 chemicals produced at a single small-scale facility may be through inventory control of precursor chemicals. A system of audit trails for chemicals and laboratory information management systems should be adopted by the facility managers to assist in verification.

h) A series of trial inspections at various types of sites should be arranged to gain experience and work out the most suitable approach to implementation of verification procedures.